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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,025	02/17/2004	Wenbin Gu	8540G-000187	9272

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EXAMINER

WALKER, KEITH D

ART UNIT PAPER NUMBER

1745

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/780,025

Applicant(s)

GU ET AL.

Examiner

Keith Walker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-29 and 31-50 is/are pending in the application.
- 4a) Of the above claim(s) 24-29 and 31-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-3 and 5-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, Claims 1-3, 5-23 and the species of Claim 12, in the reply filed on 12/12/05 is acknowledged.

Remarks

The objections to the Specification and rejections under 35 USC 112 have been withdrawn due to the amendments of 8/16/05.

Claim 1 is amended with the incorporation and canceling of Claim 4.

Claims 13, 14, 24-29 & 31-50 are withdrawn for being drawn to a non-elected group and species.

Claims 1-3, 5-12 & 15-23 are pending examination in the application.

Information Disclosure Statement

The Information Disclosure Statement (IDS) filed on 8/16/05 has been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The use of a trademark name, INCONEL, renders the claim indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-3, 5-21 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0235735 (Miyazawa) in view of US Patent 5,432,023 (Yamada).

Miyazawa teaches an electrochemical cell having: a membrane electrode assembly (MEA) comprising an anode and cathode (Figure 1, #20); an electroconductive element comprising an impermeable electrically conductive element (ECE) having a major surface facing the cathode (Figure 1, #4b) and a porous liquid distribution media (LDM) disposed along the major surface defining flow channels for transporting gas and liquid to and from the cathode (Figure 2, #14); and an electrically conductive fluid distribution layer (FDL) disposed between the liquid distribution media and the cathode for transporting gases and liquids between the cathode and the flow channels (Figure 1, #21b). The FDL and LDM are constructed and arranged to transport liquids accumulating within the cathode through the FDL and to and through the LDM. The ECE and LDM are arranged together to define the flow channels. The LDM forms an electrically conductive path between the ECE and FDL. The LDM is more hydrophilic than the FDL, overlies substantially all of the major surface of the ECE, and is disposed in regions along the major surface defining separate spaced-apart flow channels. The

LDM has an undulated configuration of peaks and valleys. The LDM internally redistributes liquid water. The electroconductive element also comprises a second ECE having a second surface facing the anode, a second LDM along regions of the second surface, and a second FDL disposed between the electroconductive element and anode and in contact with the second LDM. The LDM is composed of a hydrophilic material, for example carbon black, is coated or sprayed onto the major surface, and cured by heat. Miyazawa also teaches an electroconductive element for an electrochemical cell comprising an impermeable electrically conductive element (ECE) having a major surface (Figure 1, #4b) and a conductive, hydrophilic porous layer on the ECE that redistributes water within the layer (Figure 2, #14). The porous layer is in contact with a fluid distribution layer (FDL) that is further in contact and fluid communication with an electrode, either anode or cathode. The porous layer is more hydrophilic than the electrode of FDL and draws water from the electrode through the FDL. The ECE and porous layer are arranged together to define flow channels, and the porous layer has an undulated configuration of peaks and valleys. The porous layer forms an electrically conductive path between the ECE and FDL (Page 2, [0018]–[0029]; Page 3, [0033], [0036], [0037]; Page 5, [0056], [0057]).

Miyazawa is silent to the size of the pores for the fluid distribution layer and the liquid distribution layer.

Yamada teaches two layers of conductive porous material with differing pore sizes (10:40-60, 16:25-40). Having different pore sizes, allows the distribution of the fuel across the anode surface without crossing over into the cathode electrode. The

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sizes of the pores dictate what liquid or gas can be passed through the structure and which direction the liquid or gas passes (24:14-20, 39:5-10). The size of the pores is dependent on the material used as the porous layer and the type of fluid to be transported by the pores. Yamada teaches pore sizes of 30 microns and a formula, such that the pore sizes can be varied to optimize factors such as the fluid travel speed and the fluid volume transported (39:15-50). A nickel mesh is used for the conductive material (47:35-45).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the porous layers of Miyazawa with the pore size structures taught by Yamada to improve the efficiency of the fuel cell by keeping the reactants on the respective sides of the fuel cell, thereby preventing cross-over and a waste of reactants.

Regarding claims 17, 19, 21 & 23, these claims are seen as product-by-process limitations and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. "The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." (MPEP 2113). While these limitations have been considered, they have not been given patentable weight. The final product as taught by Miyazawa and Yamada as discussed above is considered obvious over the product of the instant application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa et al. (US 2003/0235735) in view of Davis (US 2002/0001743).

Miyazawa teaches the elements of claim 1 as discussed above but fails to teach the impermeable electrically conductive element formed of Al, Ti, stainless steel, or alloys or mixtures thereof. Davis teaches that forming bipolar plates using metals with high electrical and thermal conductivity, such as Al, Cu, and Ti, results in plates with electrical conductivity 500 times better and thermal conductivity double that of graphite. This can reduce the effect of localized heating due to areas of localized high current density and voltage drop, such as membrane dry-out. (Page 2, [0007], [0008]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made would have used a bipolar plate made of Al or Ti as taught by Davis in the electrochemical cell as taught by Miyazawa et al. in order to reduce localized heating caused by areas of high current density and large voltage drop.

Response to Arguments

Applicant's arguments with respect to claims 1-3 & 5-23 have been considered but are moot in view of the new ground(s) of rejection based on the amendments.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KW



Mark Ruthkosky for Pat Ryan

**MARK RUTHKOSKY
PRIMARY EXAMINER**